The cases in which it is demanded are accurately stated, and the directions for the proper mode of effecting it clearly laid down.

The directions for the application of the forceps, though in general correct, are not given with all the clearness which marks the author's description of the other obstetric operations. It is extremely difficult, we admit, by mere description, even with the assistance of the best executed diagrams, to teach the application of the forceps; we fear, however, that the author, by aiming at conciseness, has caused this portion of the work to be somewhat less clear and explicit than will suit the class of readers for whose especial benefit the work before us is mainly intended.

The wood-cut illustrations are numerous and well executed, while the mechanical execution of the whole work is deserving of praise. D. F. C.

ART. XXI.—*On the Theory and Practice of Midwifery.* By FLEETWOOD CHURCHILL, M. D., M. R. I. A., &c. &c.: with Notes and Additions, by ROBERT M. HUSTON, M. D., &c. &c. Third American Edition, revised and improved by the author; with one hundred and twenty-eight illustrations from drawings, by Bagg, and others, engraved by Gilbert. 8vo. pp. 525. Philadelphia: Lea and Blanchard.

THE work of Dr. Churchill is well known to the medical profession; and its merits are so fully recognized that it will be unnecessary for us, in our notice of this new edition, to do more than to state the fact of its having received from the author such additions as the progress of obstetrics have rendered necessary. In all respects, it will be found a faithful exponent of the present condition of the science. On the subject of the inhalation of ether, Dr. Churchill presents the favourable conclusions drawn by M. Dubois, from the experience of those who have the most extensively employed it, and the several objections that have been urged against its use, which, however, appear to him to be of little weight. He remarks, "I have, myself, after careful investigation and much consideration, determined to administer the ether in any obstetric operation to which I may be called, as a matter of duty. As to ordinary cases, I shall not refuse it if the patient wish for it; but as I do not see the same necessity for it, nor an equal advantage to be derived from it, I shall not necessarily urge its use."

We know of no work on Midwifery which can be consulted with more profit by the student or practitioner, than the one before us. There is scarcely a question connected with the theory or practice of the science, upon which it does not present a full exposition of the present state of our knowledge, and the experience of the most authoritative obstetricians. D. F. C.

ART. XXII.—*Researches on the Chemistry of Food.* By JUSTUS LIEBIG, M. D., Professor of Chemistry in the University of Giessen. Edited from the Manuscript of the Author, by WILLIAM GREGORY, M. D., Professor of Chemistry in the University of Edinburgh. London: 1847. 8vo. pp. 156.

THIS, the latest production of Professor Liebig, comprises his interesting and valuable researches into the nature of the soluble constituents of muscle or flesh. There is an excellent introductory section on the true method of research in animal chemistry, well-worthy of attention.

The little true progress of late years in physiological chemistry, is due, Prof. Liebig believes, to the wrong direction given to recent investigations in this most important and, at the same time, difficult department of science. Few or no professional chemists have selected it as the object of profound and thorough investigation. The important researches which Berzelius began forty years ago, as well as those of L. Gmelin, Braconnot, and Chevreul, have not been imitated or followed up in the same spirit which animated these men. No one has yet chosen some important question of the science as the problem of his life. It is as yet a frontier district into which too many adventurers have roamed. From the neglect of

physiology and pathology by the chemist, of chemistry, by the physiologist and pathologist—from the want of connection between the labours of chemists and those of pathologists, "it has happened, that animal chemistry, during the last ten years, has gained little more than a more accurate knowledge of those compounds which the animal organism applies to no further purpose in its economy; and that, at the present time, it seems as if all the wonderful properties which it exhibits were produced only by means of albumen, fibrine, gelatine, some cerebral or nervous matter, and a little bile. It is universally felt, that we are as far from a true animal chemistry, as the anatomy of the last century was from the physiology of the present day. * * * * The chemical relations which must correspond to the different structures and tissues are altogether unexamined; and yet we cannot suppose otherwise than that the nature of each secretion must stand in a definite relation of dependence, in reference to its composition and its chemical properties, with those of the substance from which it is formed, or with those of the parts which are concerned in its formation."—(p. 5—6.)

These are convincing reasons to show that, henceforth, it is indispensable that anatomy, physiology, and chemistry, should unite their forces with a view to the solution of the great questions which it is the common object of these sciences to investigate.

Another retarding error pointed out, is the undue importance attached to ultimate analysis. It has been regarded as the last and highest object of chemical investigation. When, ten years since, the ultimate analysis of organic bodies demonstrated the identity of composition in fibrine, albumen, and caseine, it was thought that the chief problem to be solved by chemistry was to ascertain, by ultimate analysis, the composition in 100 parts, of all the constituents of the body. Whilst it was believed, by means of these numerical results, a positive service had been done to physiology, the only real addition made was an empty formula, of the accuracy of which there was no evidence whatever. "Now," says Dr. Liebig, "that we have been for ten years in possession of these formulæ, every one must perceive that we have made no real progress. The cause of this is obvious to all who know the true value of ultimate analysis. Ultimate analysis is a means of acquiring knowledge, but is not itself that knowledge."—(p. 11.) It is not in itself sufficient; it must be accompanied by the study of the products of decomposition.

There is much that is true in all this, with some exaggeration,—as where the author, for example, asserts that we know as much of the chemical constitution of the blood constituents as we did forty years ago. He forgets, too, that he has himself contributed in no slight degree towards the very system of whose faultiness and unproductiveness he now so loudly complains. This introductory section is disfigured also by the unnecessarily harsh and unscientific manner in which the great rival of the author, Mulder, is treated in regard to the proteine controversy.

The chemical researches contained in the present work are both highly interesting and valuable to the physiologist and practical physician. They are additional proofs of the strictly chemical changes involved in the processes of the organism. The editor, Dr. Gregory, observes—"The medical man will find in these researches a prospect of many and great improvements in practice, whether as regards dietetics, or the action of acids, alkalies, and salts on the digestive and respiratory processes; and with respect to both, it is to chemistry that he must look for assistance in his efforts to advance Lastly, the present work contains some most valuable practical applications of the chemical discoveries therein detailed, to an art which immediately concerns the whole of mankind; namely, the culinary art."—(Preface, p. x.)

Section II. is on the *Constituents of the Juices of Flesh.* In 1835, Chevreul described, as an ingredient of the liquid obtained by boiling flesh with water, a new substance, under the name of *kreatine* (from κρέας, flesh), which was distinguished by its properties from all known compounds. Berzelius, after the discovery of Chevreul became known, tried in vain to prepare this substance from raw-beef, and he therefore believed that it was an accidental ingredient, whose presence depended on peculiar circumstances in the feeding of the cattle. Wöhler subsequently obtained it from the soup of beef, and Schlossberger found it in the flesh of the

alligator. After many fruitless attempts Liebig succeeded in obtaining kreatine. Dr. Gregory remarks "that the apparent simplicity of the results, and even of the processes described, gives a very inadequate idea of the laborious and difficult nature of the investigation. Having myself repeated several of these processes, I have been enabled to perceive, that, unless Baron Liebig had devoted to the subject his whole energies for a long time, and unless, moreover, he had operated on a scale so large as few experimenters would have ventured on, the whole subject would have remained as obscure as ever."—(Preface, p. xi.)

On subjecting the finely minced meat of newly killed animals to the action of water, a red or reddish coloured fluid is obtained, having the peculiar taste of blood. When heated in a water bath the albumen is first coagulated; and, finally, at a considerably higher temperature—in fact, actual ebullition—the colouring matter. The filtered liquid is acid. Its colour varies with the kind of flesh, being reddish in one, and hardly coloured in another. By evaporation it becomes brown from the presence of a free acid, which should previously be removed by a strong aqueous solution of baryta, which is to be added as long as there is any turbidity. On concentrating the liquid by evaporation, and when it has been reduced to about $\frac{1}{20}$th of its original volume, and become consistent, *kreatine* is deposited in crystals. "The quantity of kreatine obtained from different kinds of flesh, is very unequal. Of all kinds, the flesh of fowl and that of the marten contain the most, then that of the horse, the fox, the roe deer, the red deer, and hare, the ox, pig, calf, and finally, that of fishes."—(p. 45.) It is greater too in wild than in domestic animals, and its amount bears an obvious relation to the amount of fat, from fat flesh mere traces being sometimes obtained. Whilst kreatine has been found in the flesh of all the higher classes of animals, it has not yet been detected in the brain, liver, or kidneys, although it may be obtained in abundant quantity in the heart of the ox. On being purified, "the crystals of kreatine are colourless, perfectly transparent and of great lustre; they belong to the klinorhombic system, and form groups, the character of which is exactly similar to that of sugar of lead."—(p. 49.) The formula of crystallized kreatine is $C_8\ N_3\ H_{11}\ O_6$, whilst that of anhydrous kreatine is $C_8\ N_3\ H_9\ O_4$. Kreatine dissolves easily in boiling water, and a solution saturated at 212° forms on cooling, a mass of small brilliant needles. It is nearly insoluble in cold alcohol. It is neither acid nor basic.

"The action of strong mineral acids upon it is very remarkable. A solution of kreatine, to which, while cold, hydrochloric acid is added, gives by spontaneous evaporation crystals of unchanged kreatine. But when heated with strong hydrochloric acid, a solution of kreatine no longer yields crystals of that substance. The same result is obtained with sulphuric, phosphoric, and nitric acids. When kreatine is dissolved in one of these acids, and the solution gently evaporated, crystals are obtained, which are very soluble in alcohol, a property not belonging to kreatine. These crystals contain a portion of the acid employed in a state of combination."—(p. 53).

In this reaction from kreatine and the strong mineral acids, by a transformation of its elements a new body of totally different chemical properties (a true organic alkali) is formed, which Liebig has called *kreatinine.** It is obtained pure from the sulphate or hydrochlorate. The crystals belong to the monoklinometric system. It is more soluble in cold water than kreatine; in hot water it is much more soluble; and it dissolves in boiling alcohol, and crystallizes on cooling. In its chemical character kreatinine is quite analogous to ammonia. Its various reactions with chloride of zinc, nitrate of silver, corrosive sublimate, on the salts of ammonia, on those of copper, and on the bichloride of copper, which are decided, are noticed. The conversion of kreatine into kreatinine, by the action of mineral acids, depends on the separation of 4 equivalents of water; this gives for the formula of kreatinine $C_8\ N_3\ H_7\ O_2$.

Both kreatine and kreatinine have been found by Liebig to be constituents of the urine, and he asserts that the azotized substance discovered three years since

* We have had an opportunity of examining specimens of both kreatine and kreatinine obtained by Liebig himself, and presented by him to Prof. Gibson, of the University of Pennsylvania. They are now in the possession of Prof. Rogers of that institution.

by Pettenkofer* is a mixture of kreatinine with a little kreatine; and the urine will be found to be both a convenient and economical source of those substances.

Sarcosine is a new organic base, obtained by the action of boiling barytic water on kreatine. It is procured pure from the sulphate. The crystals of sarcosine are right rhombic prisms; acuminated on the ends by surfaces set perpendicular on the obtuser angles of the prism. They are of considerable size, perfectly transparent, and colourless; and are very soluble in water, quite sparingly in alcohol, and insoluble in ether. When dried at 212°, they retain their original aspect; at a somewhat higher temperature they melt, and sublime without residue. The formula for sarcosine is $C_6\ N_1\ H_7\ O_4$. It has no action on vegetable colours. It acts with acids as a powerful base. Kreatine contains the elements of sarcosine and of urea. "I have ascertained that a solution of urea in barytic water is resolved, by long boiling, into carbonate of baryta and ammonia, with the same appearances as those above described, [in the process for obtaining sarcosine;] and I have also ascertained that urea is present in the liquid when kreatine is boiled with baryta, if examined before the whole of the kreatine is decomposed."—(p. 75.) Sarcosine is isomeric with the *lactamide* of Pelouze, and the *urethane* of Dumas; but the insolubility of sarcosine in ether and alcohol is sufficient to distinguish it from either of these two compounds. Sarcosine and urea are not, however, the only products of the decomposition of kreatine by baryta; a substance much resembling urethane, of feeble acid reaction, uncombined with baryta, very soluble in water and alcohol, and in thirty parts of ether, crystallizing in long colourless prisms or scales, was also obtained, but in too small quantity for analysis.

"When the liquid from flesh, treated as formerly described, has entirely deposited the crystals of kreatine, and is somewhat further concentrated by evaporation, if alcohol be added to it in small quantities till the whole becomes milky, it deposits, when allowed to rest for some days, yellowish or white granular crystals, foliated or acicular crystals, which may be separated from the viscid mother liquid, although slowly, by filtration, and should be washed with alcohol. These crystals are a mixture of many different substances, among which kreatine is invariably found. If the whole of the phosphoric acid has not previously been removed from the original solution of flesh, this deposit will contain phosphate of magnesia; but the chief ingredient is the potash or baryta salt of a new acid, to which I shall give the name of *Inosinic Acid.*"—(p. 77.)

Inosinic Acid is easily prepared from the inosinate of baryta, by the cautious addition of sulphuric acid to separate the baryta; or from the inosinate of copper by the action of sulphuretted hydrogen. "Prepared by the other process, the solution of the inosinic acid has a strong acid reaction, and possesses an agreeable taste of the juice of meat. When evaporated, it yields a syrup, which, after weeks, exhibits no signs of crystallization. If this syrup be mixed with alcohol, the thick viscid fluid is changed into a hard, firm, pulverulent mass, of which alcohol dissolves only traces. From a concentrated aqueous solution the acid is precipitated in white amorphous flocculi. It is insoluble in ether."—(p. 78.) The quantity of this acid was not sufficient for an analysis of it, but the analysis of the baryta salt was sufficient to determine the composition of the acid. The formula of the anhydrous acid is $C_{10}\ N_2\ H_6\ O_{10}$; and if we suppose the baryta replaced by its equivalent of water, the formula of inosinic acid will be $C_{10}\ N_2\ H_7\ O_{11} = C_{10}\ N_2\ H_6\ O_{10} + HO$.

Inosinates of potash, soda, baryta, copper, silver, have been already obtained. Inosinic acid is probably a coupled acid.

Lactic Acid has been found by Liebig to be a constituent of flesh,—the analysis given showing "that the non-nitrogenized acid occurring in the animal organism is identical with the acid formed in milk when it becomes sour, and into which sugar of milk, starch, grape sugar, and cane sugar are converted by contact with animal substances in a state of decomposition."—(p. 93.) Thus confirming the researches of Dumas† and others. The supposed office of lactic acid in the economy will be presently mentioned. Liebig obtained the lactates of lime and zinc

* Annalen der Chemie und Pharmacie, vol. lii. p. 97.
† Chimie Physiologique et Médicale, p. 697, Paris, 1846.

from this source, and analyzed them. The large quantity of inorganic substances contained in the juice of beef has already been indicated by Chevreul. The preponderating inorganic constituents of the juice of flesh, are the alkaline salts. Now, as every part of the animal organism has its significance, Liebig thought it of importance to make some experiments on the nature of the mineral acids and alkaline bases occurring in the juice of flesh, and their mutual relations; experiments which, however imperfect, might still serve as points of departure for future researches.

The ash of the juice of meat, according to Liebig, contains only alkaline phosphates and chlorides; no alkaline carbonates or sulphates are present. The soluble salts contain the different modifications of phosphoric acid, which are easily distinguished by their action on nitrate of silver. The ashes of the juice of flesh, in the horse, ox, fox, and roe-deer, contain salts of phosphoric acid, with two atoms (pyrophosphates), and with three atoms (tribasic phosphates) of fixed alkaline base. The ashes of the juice of the flesh of fowl give a different result; they contain alkaline pyrophosphates and metaphosphates. "The whole amount of alkalies, therefore, present in the juice of the flesh of the ox, horse, fox, and roe-deer, is not sufficient to convert the phosphoric acid of the juice entirely into the so called neutral salt, that is the salt with three atoms of fixed base. In the fowl, the whole of the alkali is not even sufficient to convert the phosphoric acid entirely into the salt with two atoms of fixed base."—(p. 98.) It is, hence, evident that the organic acids present in the juice, the lactic inosinic acids, &c., taken together, are not sufficient to form neutral salts with the alkalies contained in it—the potash and kreatinine; "and this necessarily implies that the acid reaction of the juice of flesh is caused by the presence of acid salts of the alkalies with the three acids, phosphoric, lactic, and inosinic acids. Inosinic acid constitutes too small a part of the juice to allow us to ascribe to it a perceptible share in producing the acid quality of that fluid; and this acidity depends, therefore, on the presence of acid alkaline lactate and acid alkaline phosphate, (phosphate with one atom of alkali;) or, in other words, of neutral alkaline lactate and phosphate, along with free lactic and phosphoric acids."—(p. 99.) An equilibrium exists between these free acids.

The blood-vessels and lymphatics contain an alkaline fluid, whilst that of the flesh is acid; the tissues of which the vessels are composed are permeable for the one or the other of these fluids. "There then," observes Liebig, "are two conditions favourable to the production of an electrical current, and it is far from improbable, that such a current takes a certain share in the vital processes, although its action be not always indicated by proper electrical effects."—(p. 104.)

Liebig considers as proved, "that the lactic acid of the organism is employed to support the respiratory process, and the functions performed by sugar, starch, and in general all those substances which, in contact with animal matters, are convertible into lactic acid, ceases to be an hypothesis. The substances are converted in the blood into lactates, which are destroyed as fast as they are produced, and which only accumulate where the supply of oxygen is less, or where some other attraction is opposed to the agency of that element."—(p. 103.)

The differences of the salts in the juice of flesh, and in the blood and lymph, are next considered. In the former, we have phosphate of potash and chloride of potassium; and in the latter, phosphate of soda and chloride of sodium. "But perhaps the most interesting observation," observes the editor, Dr. Gregory, "next to the discovery of kreatine as a constant ingredient of flesh, of kreatinine, a powerful base in the juice of flesh, and of both in the urine, is the demonstration, complete, as it appears to me, *of the true function of the phosphate of soda in the blood.* This function, that of absorbing carbonic acid and giving it out in the lungs, is here shown to depend on the minute chemical characters of the salt in question, and we now see how it happens that phosphate of soda is essential to the blood, and cannot be replaced by phosphate of potash, a salt which, although in many points analogous, differs entirely from phosphate of soda, in its tendency to acquire an acid instead of an alkaline reaction, and in its relation to carbonic acid. In this way, the beautiful researches of Graham, on the phosphates, are now finding their application, in the minutest point, to physiology. The same remark applies to the action of common salt on the phosphate of potash, which satisfactorily

accounts for the presence of soda in the blood of animals whose food contains only phosphate of potash, but which either find common salt in their food, or obtain it in addition."—(Preface, p. ix.) "It is easy to see," says Liebig, "that a more exact study of the influence which alkalies, salts, and the mineral acids exert on the respiratory process in the normal state, must lead to the most beautiful and valuable results, in regard to their employment in various diseases"—(p. 120.)

The third section is on the "Practical Application of the Results of the Foregoing Investigations." The effect of boiling, on flesh, is first considered. From the removal of its essential constituents, boiled meat, without the soup formed in boiling it, is so much the less adapted to nutrition, the greater the quantity of the water in which it has been boiled, and the longer the duration of the boiling. Cold water extracts all the soluble constituents of flesh. The smell and taste of roasted flesh are due to the soluble constituents of the juice, which have undergone a slight change under the influence of the higher temperature. Flesh which has been rendered quite tasteless by boiling with water, acquires the taste and all the peculiarities of roasted flesh, when it is moistened and warmed with a cold aqueous infusion of raw flesh which has been evaporated till it has acquired a dark brown colour. The flavour of soup, and of the different kinds of flesh, depends on the soluble matter, and it is heightened by lactic acid, or by chloride of potassium. The *stock* employed so much by cooks, is essentially a concentrated infusion of flesh. Its addition not only improves the flavour, but often restores the soluble matter removed in previous operations, and thus renders it much more wholesome and nutritious than it otherwise would be. The proportion of fibrine and albumen in flesh, is always in inverse proportion. The flesh of old animals contains much fibrine and but little albumen. The tenderness of boiled or roasted meat, depends on the quantity of the albumen deposited between the fibres and there coagulated; for the contraction or hardening of the fibrinous fibres, is thereby to a certain extent prevented. It depends also on the duration of the boiling; for the albumen also becomes harder by continued boiling, without, however, assuming a tough consistence.

Liebig recommends, as the best mode of boiling meat, that the water be in a state of ebullition when the flesh is introduced, that the boiling be kept up for some minutes, and then so much cold water added as to reduce the temperature of the water to 165° or 158°; and the whole kept at this temperature for some hours. By this method, the albumen of the surface is coagulated immediately, and a crust being formed, the external water cannot act on the flesh, and the cookery is effected by the gradual transmission of the heat to the interior of the mass. "The flesh retains its juiciness, and is quite as agreeable to the taste as it can be made by roasting; for the chief part of the sapid constituents of the mass is retained, under these circumstances, in the flesh."—(p. 126.)

Liebig's formula for making soup is as follows:—

"When 1 lb. of lean beef, free of fat, and separated from the bones, in the finely-chopped state in which it is used for beef sausages or mince-meat, is uniformly mixed with its own weight of cold water, slowly heated to boiling, and the liquid, after boiling briskly for a minute or two, is strained through a towel from the coagulated albumen and fibrine, now become hard and horny, we obtain an equal weight of the most aromatic soup, of such strength as cannot be obtained even by boiling for hours, from a piece of flesh."—(p. 132.) Salt and other condiments are to be added, and it may be tinged somewhat darker by means of roasted onions or burnt sugar. This forms, Liebig affirms, the very best soup that can in any way be prepared from 1 lb. of flesh. By evaporation to dryness in the water-bath, a dark brown soft mass is obtained, of which half an ounce suffices to convert 1 lb. of water, with the addition of a little salt, into a strong, well-flavoured soup. The tablets of so-called portable soup are not to be compared to this extract of flesh, for they consist principally of gelatine, which is not nutritious. Liebig thinks that his extract of flesh will prove invaluable for the provisioning of ships and fortresses, instead of salt meat, which, when prepared in the ordinary manner, is deficient in nourishing properties, the brine abstracting the chief nutritious constituents; the albumen, soluble phosphates, lactic acid, kreatine, and kreatinine. Liebig suggests that the use of a salt containing chlorides of calcium and magnesia, may render the meat thus prepared less unwhole-

some; for, if along with such meat, vegetables rich in potash, be eaten, the conditions are present which determine the reproduction during digestion, of the deficient alkaline phosphates.

Liebig, who previously had stoutly denied the presence of lactic acid in the gastric juice, now admits its existence on the faith of Lehman's experiments, and observes, "and thus the problem of the digestive process in the stomach would appear, in its chemical aspect, to be completely solved!"—(p. 138.)

In conclusion, the distinguished author desires distinctly to state that he is far from considering the researches contained in the present work, as complete; they are, on the contrary, the first steps in a new career; and indicate alone the path to be hereafter pursued by chemists. The subject is only opened, much less exhausted; many obscure points are still to be elucidated; and various substances are yet to be distinguished in the muscular tissues alone.

Independent of valuable positive results, the character and tone of the work are, as the reader will perceive from the analysis we have attempted, eminently philosophical, with the single exception before alluded to,—an extreme acerbity in the controversial portions. M. C.

Art. XXIII.—*On the Causes and Treatment of Abortion and Sterility: Being the result of an extended practical inquiry into the Physiological and Morbid conditions of the Uterus, with reference especially to Leucorrhœal affections and the Diseases of Menstruation.* By James Whitehead, F. R. C. S., Surgeon to the Manchester and Salford Lying-in Hospital. Και γαρ εγων, επικουρος εων, ... ηκω . . . ' Αλλ' ἄγε δὴ καὶ νῶϊ μεδώμεσθα θούριδος αλκης. Hom. Ili., Lib. v. Quidquid valde utile sit, id fieri honestum, etiam si antea non videretur.—Cic. de Offi., Lib. iii. 8vo. pp. 368. Philadelphia: Lea and Blanchard.

The work of Mr. Whitehead presents a very clear and satisfactory account of the physiology, hygiene, and morbid affections of the uterus, in a plain unaffected style. The observations of the author are evidently the result of extensive personal researches carefully conducted, and, under circumstances particularly well adapted for the acquisition of correct views in reference to the class of uterine diseases, to which the volume more particularly refers. The pathology and treatment of these diseases, are illustrated by a series of cases, which have been studiously divested, so far as is consistent with the entireness of the leading phenomena, of all prolix particulars, such as daily reports respecting the character of the pulse, appearance of the tongue, the state of the secretions, &c., which usually render cases so tedious in the perusal. No general rules are presented in respect to the treatment of the affections described, for the simple reason, the author remarks, that much remains still to be done in this branch of practice, and also, because he believes sufficient to be said on that subject, in connection with the illustrative cases.

The first four chapters are devoted to the physiology of menstruation and the diseases of this function. The author considers in detail the signs and the age of puberty, the conditions which principally influence menstruation at its commencement; the properties of the menstrual fluid; the surface by which it is secreted, and the age at which menstruation finally ceases; the influence of climate and employment in influencing the development of puberty, and the influence of temperament and habit of body, in determining the character of disease in difficult menstruation, embracing some interesting remarks upon the scrofulous diathesis.

The diseases of menstruation are considered under the heads of retention and suppression of the menses, difficult menstruation, and vicarious and metrorrhagic menstruation. The diseases of the last menstrual crisis treated of by Mr. Whitehead, are purulent leucorrhœa, uterine hæmorrhage, endo-uteritis, uterine phlebitis, cauliflower disease of the cervix uteri, with malignant degeneration of the uterine appendages, and finally corroding ulcer of the uterus.

The fifth chapter treats of the signs of pregnancy, and the four succeeding chapters are devoted to the subject of abortion. In this latter connection, we have some interesting remarks on the actual duration of the child bearing period; and the